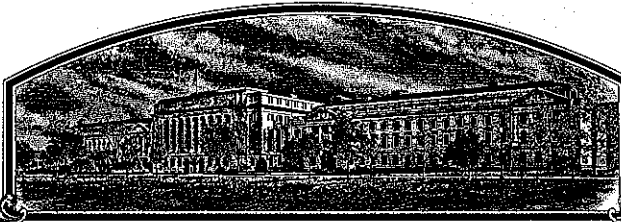


No.

9300194



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Ohio Agricultural Research and
Development Center and USDA-ARS
Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS OF THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.) Waived, except that this waiver shall not apply to breeder seed, foundation seed, labeling requirements, and blending limitations)

SOYBEAN
'Charleston'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 29th day of September in the year of our Lord one thousand nine hundred and ninety-five.

Attest:

Martha A. Hunter

Commissioner

Plant Variety Protection Office

Agricultural Marketing Service

Samuel J. Phillips
Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE (Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) Ohio Agricultural Research and Development Center and USDA-ARS		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. HC85-6724	3. VARIETY NAME Charleston
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) Ohio Agricultural Research and Development Center 1680 Madison Avenue Wooster, OH 44691		5. PHONE (include area code) 216-263-3875	FOR OFFICIAL USE ONLY PVPO NUMBER 9300194 Filing and Examination Fee: \$ 2325.00 Date April 9, 1993 Certificate Fee: \$ 275.00 Date AUG. 4, 1995
6. GENUS AND SPECIES NAME Glycine max	7. FAMILY NAME (Botanical) Leguminosae		
8. CROP KIND NAME (Common Name) Soybean	9. DATE OF DETERMINATION 2/15/91		
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Agricultural Experiment Station			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION		12. DATE OF INCORPORATION	

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Dr. Richard L. Cooper, Department of Agronomy
Ohio Agricultural Research and Development Center
Wooster, OH 44691

PHONE (include area code): 216-263-3875

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☐ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
- g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)
☒ YES (If "YES," answer items 16 and 17 below) ☐ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date. _____)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?
☒ YES (If "YES," give names of countries and dates) USA January 1, 1993
☐ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT [Owner(s)] Richard L. Cooper	CAPACITY OR TITLE Plant Breeder	DATE 1/4/93
SIGNATURE OF APPLICANT [Owner(s)]	CAPACITY OR TITLE	DATE

Charleston

Exhibit A

Origin and Breeding History of the Variety

Charleston soybean [*Glycine max* (L.) Merr.] is an F_4 plant selection from the cross of two determinate semidwarf breeding lines, HC74-634RE x HC78-676. HC74-634RE is from the cross Williams x Ransom and HC78-676 from the cross L70T543G x L74D-619. L70T543G is an indeterminate line from the cross L15 x Amsoy 71 and L74D-619, a determinate semidwarf line from a Williams x Ransom cross. L15 is a phytophthora resistant (*Rps*₁) backcross line of Wayne. The cross was made in 1982 by R. L. Cooper, USDA, ARS Research Agronomist at the Ohio Agricultural Research and Development Center (OARDC), Wooster, OH. The F_1 was grown in the Puerto Rico winter nursery in the winter of 1982-83 and the F_2 grown at OARDC in 1983. Single pods were pulled from the F_2 plants and advanced by single seed descent to the F_4 in Puerto Rico in the winter of 1983-84. Single F_4 plants were harvested in Puerto Rico and planted as F_4 -derived F_5 observation rows at OARDC in 1984. Of 14 $F_{4.5}$ lines, 12 lines were advanced for yield testing as $F_{4.6}$ lines in 1985 in one-row, unbordered plots. Eleven of these 12 lines were advanced for yield testing in the F_7 in bordered row plots in 1986. Ten of these lines were advanced for yield testing in replicated plots at Wooster and S. Charleston, OH in 1987. Based on its superior yield performance, the line HC85-6724 was entered in the 1988 Regional Prelim III Test. HC85-6724 was advanced to the Uniform Regional Test III, Northern States in 1989 and was tested from 1989 thru 1991 in Delaware, Iowa, Illinois, Indiana, Kentucky, Kansas, Maryland, Missouri, Nebraska, New Jersey, Ohio, Pennsylvania and South Dakota. Based on the results of these regional yield trials, 0.2 hectares of Breeder's Seed increase of HC85-6724 was planted by Ohio Foundation Seeds at Croton, OH in 1991 to produce 600 kg of seed in anticipation of potential release. HC85-6724 was released in 1992 and Breeder's Seed was distributed to the releasing states of Ohio, Iowa and Missouri. HC85-6724 was named Charleston after the OARDC Western Branch Experiment Station at S. Charleston, OH, with publicity release August 1, 1992.

Variants observed during the development of this variety were few. In the 1991 increase of Breeder's Seed, no variants were observed except for those few that might be traced back to slight admixtures resulting from incomplete combine clean out and these plants were rogued out. Variants resulting in future generations should be within allowable Certification maximums.

Charleston

Exhibit B

Novelty Statement and Botanical Description of the Variety

Charleston is a determinate (dt_1dt_1) semidwarf variety of Group III maturity. It matures 2 days later than the determinate semidwarf varieties, Sprite 87 and Hobbit 87, and can be distinguished from these white flowered varieties by its purple flowers. Charleston can be distinguished from indeterminate cultivars by its determinate growth habit, resulting in a terminal pod cluster and shorter plant height. It differs from Southern determinate varieties by an early flowering gene, e_1 . The $dt_1dt_1e_1e_1$ genotype results in the semidwarf phenotype of Charleston and other semidwarf varieties. Charleston is highly tolerant to Phytophthora root rot but does not have major gene resistance to this disease.

Charleston was developed specifically for high yield environments where early lodging frequently limits the yield of taller indeterminate varieties. Because of its smaller plant size and greater lodging resistance, Charleston is especially responsive to narrow rows (solid-seeding in 17- to 25-cm row widths) and high seeding rates (562,000 to 750,000 seeds/ha in 17-cm rows). Although Charleston will yield well in 75-cm row widths, it is recommended primarily for solid seeding to maximize yields.

Charleston has purple flowers, tawny pubescence, tan pods and shiny yellow seeds with a black hilum. It can readily be distinguished from other Maturity Group III semidwarf varieties by its purple flowers.

Most Similar Variety

The variety most similar to Charleston is another Group III determinate semidwarf variety, Hobbit 87. Charleston can be distinguished from Hobbit 87 by its purple flowers, later maturity, and Phytophthora susceptibility. Hobbit 87 has white flowers and is resistant to most prevalent races of Phytophthora.

Uniform Regional Test III, 1989-90 (Mean of 48 locations)

Variety	Yield	Matur- ity	Lodging	Height	Seed Quality	Seed Size	<u>Composition</u>	
							Protein	Oil
	(kg/ha)	(date)	(score) ¹	(cm)	(score) ²	(g/100)	(%)	(%)
Charleston	52.8	9/29	1.5	60	1.6	15.8	40.7	20.6
Hobbit	49.0	9/27	1.2	55	1.8	16.2	39.1	22.1

¹ 1 = erect to 5 = prostrate.

² 1 = very good to 5 = very poor.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

FORM APPROVED: UMB NO. 0581-0055

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) Ohio Agricultural Research and Development Center and USDA-ARS	TEMPORARY DESIGNATION HC85-6724	VARIETY NAME Charleston
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) Ohio Agricultural Research and Development Center 1680 Madison Avenue Wooster, OH 44691		FOR OFFICIAL USE ONLY PVPO NUMBER 9300194

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., 0 9). Started characters ★ are considered fundamental to an adequate soybean variety description. Other characters should be described when information is available.

1. SEED SHAPE:

1



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)

2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

★ 2. SEED COAT COLOR: (Mature Seed)

1

1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other (Specify) _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

2

1 = Dull ('Consoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

★ 4. SEED SIZE: (Mature Seed)

1 6

Grams per 100 seeds

★ 5. HILUM COLOR: (Mature Seed)

6

1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other (Specify) _____

★ 6. COTYLEDON COLOR: (Mature Seed)

1

1 = Yellow 2 = Green

★ 7. SEED PROTEIN PEROXIDASE ACTIVITY:

1

1 = Low 2 = High

★ 8. SEED PROTEIN ELECTROPHORETIC BAND:

1

1 = Type A (SP1^a) 2 = Type B (SP1^b)

★ 9. HYPOCOTYL COLOR:

3

1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

★ 10. LEAFLET SHAPE:

3

1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other (Specify) _____

11. LEAFLET SIZE:

☐ 21 = Small ('Amsoy 71'; 'A5312')
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

12. LEAF COLOR:

☐ 31 = Light Green ('Weber'; 'York')
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

★ 13. FLOWER COLOR:

☐ 2

1 = White

2 = Purple

3 = White with purple throat

★ 14. POD COLOR:

☐ 1

1 = Tan

2 = Brown

3 = Black

★ 15. PLANT PUBESCENCE COLOR:

☐ 2

1 = Gray

2 = Brown (Tawny)

16. PLANT TYPES:

☐ 31 = Slender ('Essex'; 'Amsoy 71')
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

★ 17. PLANT HABIT:

☐ 1

1 = Determinate ('Gnome'; 'Braxton')

2 = Semi-Determinate ('Will')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

★ 18. MATURITY GROUP:

☐ 0 ☐ 6

1 = 000

2 = 00

3 = 0

4 = I

5 = II

6 = III

7 = IV

8 = V

9 = VI

10 = VII

11 = VIII

12 = IX

13 = X

★ 19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

★

☐ 0Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)

★

☐ 0Bacterial Blight (*Pseudomonas glycinea*)

★

☐ 0Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

★

☐ 0Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojina*)

★

☐ 0

Race 1

☐ 0

Race 2

☐ 0

Race 3

☐ 0

Race 4

☐ 0

Race 5

☐

Other (Specify)

☐ 0Target Spot (*Corynespora cassicola*)☐ 0Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☐ 0Powdery Mildew (*Microsphaera diffusa*)

★

☐ 2Brown Stem Rot (*Cephalosporium gregatum*)☐ 0Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

- ★ ☐ 2 Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)
- ☐ 2 Purple Seed Stain (*Cercospora kikuchii*)
- ☐ 0 Rhizoctonia Root Rot (*Rhizoctonia solani*)
- Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)
- ★ ☐ 1 Race 1 ☐ 0 Race 2 ☐ 0 Race 3 ☐ 1 Race 4 ☐ 0 Race 5 ☐ 0 Race 6 ☐ 0 Race 7
- ☐ 0 Race 8 ☐ 0 Race 9 ☐ 0 Other (Specify) _____

VIRAL DISEASES:

- ☐ 0 Bud Blight (Tobacco Ringspot Virus)
- ☐ 0 Yellow Mosaic (Bean Yellow Mosaic Virus)
- ★ ☐ 0 Cowpea Mosaic (Cowpea Chlorotic Virus)
- ☐ 0 Pod Mottle (Bean Pod Mottle Virus)
- ★ ☐ 1 Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

- Soybean Cyst Nematode (*Heterodera glycines*)
- ★ ☐ 1 Race 1 ☐ 1 Race 2 ☐ 1 Race 3 ☐ 1 Race 4 ☐ Other (Specify) _____
- ☐ 0 Lance Nematode (*Hoplolaimus Colombus*)
- ★ ☐ 0 Southern Root Knot Nematode (*Meloidogyne incognita*)
- ★ ☐ 0 Northern Root Knot Nematode (*Meloidogyne Hapla*)
- ☐ 0 Peanut Root Knot Nematode (*Meloidogyne arenaria*)
- ☐ 0 Reniform Nematode (*Rotylenchulus reniformis*)
- ☐ 0 OTHER DISEASE NOT ON FORM (Specify): _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ★ ☐ 2 Iron Chlorosis on Calcareous Soil
- ☐ Other (Specify) _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ☐ 1 Mexican Bean Beetle (*Epilachna varivestis*)
- ☐ 0 Potato Leaf Hopper (*Empoasca fabae*)
- ☐ Other (Specify) _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Sprite 87	Seed Coat Luster	Hobbit 87
Leaf Shape	Hobbit 87	Seed Size	Hobbit 87
Leaf Color	Hobbit 87	Seed Shape	Hobbit 87
Leaf Size	Hobbit 87	Seedling Pigmentation	Hobbit 87

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/POD
				CM Width	CM Length	% Protein	% Oil		
Charleston Submitted	129	1.5	60	-	-	41	21	15.8	2.5
Hobbit 87 Name of Similar Variety	127	1.2	55	-	-	39	22	16.2	2.5

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.J. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A₂ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

Charleston

Exhibit E

Basis of Ownership

Charleston soybean cultivar is considered jointly owned by the Ohio Agricultural Research and Development Center of The Ohio State University (OARDC-OSU) and the USDA Agricultural Research Service (ARS). The basis for this position is (1) the individual F_4 -derived line, which eventually was released as Charleston, was selected at the OARDC, Wooster, OH, in 1985, by Dr. R. L. Cooper, USDA-ARS Research Agronomist and Adjunct Professor in the Department of Agronomy, OARDC-OSU (2) the line was tested extensively in Ohio at OARDC-OSU Branch Experiment Stations from 1986-1991 by Dr. Cooper, and (3) the line (HC85-6724) was entered as an Ohio breeding line in regional tests from 1988 to 1991 without claims being made upon it. The seed supply was continuously under the control of OARDC-OSU and USDA-ARS until the distribution of seed to the Foundation Seed organizations of those states in which the land-grant institutions were cooperators in the public release of Charleston. The seed will become publicly available in the spring of 1994 after inspection and tagging as certified seed.

8



United States
Department of
Agriculture

Agricultural
Research
Service

Midwest Area

9300194
Agronomy Dept.
OSU/OARDC
1680 Madison Ave.
Wooster, OH 44691

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No.

Variety and Kind: 'Charleston', Soybean

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the certificate on the above variety be issued with a notation on the certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived, except that this waiver shall not apply to Breeders Seed, Foundation Seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

Ohio Agricultural Research & Development Center, The Ohio State

University and USDA-Agricultural Research Service

1/4/93

(Date)

Richard L Cooper

(Signature)